ELabELN | Template Use Case White Paper

Cell Culture Experiment Template

Structured Documentation for Adherent Cell Passage — From Confluency Check Through Viability Count and Passage-History Tracking

APPLIES TO

- Academic and life sciences research laboratories
- Biotechnology and cell biology R&D groups
- Core cell culture and tissue-culture facilities
- Teaching laboratories and contract research organizations (CROs)

RELEVANT COMPLIANCE & INTEGRITY FRAMEWORKS

- FDA 21 CFR Part 11 — Electronic records and signatures
- EU Annex 11 — Computerized systems in regulated environments
- GAMP 5 — Software validation for regulated industries
- NIH / NSF reproducibility and cell-line authentication expectations

LabLynx, Inc.
3350 Riverwood Pkwy SE, Suite 1900, Atlanta, GA 30339
866.522.5969 | elabeln.com | info@lablynx.com

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1. Executive Summary

Cell culture is the quiet foundation of most life-sciences research: before an assay, a transfection, or a drug screen can run, someone has to maintain a healthy, uncontaminated, correctly identified cell line. That maintenance is a recurring workflow — a passage every few days, indefinitely — and it carries a subtle, compounding risk. A line's passage number, its viability trend, its media and serum lots, and its mycoplasma status all accumulate over time, and any one of them going undocumented can quietly invalidate months of downstream work through line drift or contamination that no one noticed. When passage notes are scattered across flask labels, a shared spreadsheet, and a rotating cast of students, the cumulative history that makes a result trustworthy simply does not exist.

The ELabELN Cell Culture Experiment Template solves this by providing a pre-built, fully structured passage record that loads from the template library in a single click. It ships with a 10-step subculture protocol, validated media references, pre-wired viability and passage tracking, and typed inputs for cell line, passage number, seeding density, confluency, viability percentage, and mycoplasma status. Media, FBS, and trypsin lots link to the ELabELN inventory, and the tamper-evident audit trail captures every passage, every viability count, and every mycoplasma test — so the cumulative passage history assembles itself as a by-product of routine work.

This white paper describes what the template contains, the maintenance use case it is designed to support, the upstream and downstream workflows it connects to, the benefits it delivers to the scientist, and how a laboratory can deploy it and begin culturing within days.

> **KEY BENEFIT**
> Labs that adopt the cell culture template stop starting fresh notes for every passage, capture media/FBS lot traceability automatically, and build a queryable per-line history — passage number, viability trend, and mycoplasma status — that protects every downstream experiment from line drift and contamination and stands up to 21 CFR Part 11 review.

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2. What Is Cell Culture Passaging, and Why Does Documentation Matter?

2.1 The Technique

Maintaining a cell line means subculturing — passaging — it on a regular schedule so the cells stay healthy and never over-grow. For adherent cells such as HEK293, a passage involves checking confluency under the microscope, aspirating spent media, washing, detaching the cells with a dissociation reagent (typically Trypsin-EDTA), quenching the enzyme with serum-containing media, centrifuging, resuspending, counting cells and scoring viability on a hemocytometer with Trypan Blue, and seeding a fresh flask at a defined split ratio. Each passage increments the line's passage number and produces a viability reading — two values that, tracked over time, describe the health and age of the culture.

This routine is performed across the whole life-sciences bench, for any adherent or suspension line maintained for experimental use. What makes documentation matter is not the difficulty of a single passage but the cumulative history it belongs to: high passage numbers cause genetic and phenotypic drift, undetected mycoplasma silently corrupts results, and a change in serum lot can shift cell behavior. The cells feeding a given experiment are only as trustworthy as the record of how they were maintained.

The consequence is direct: **if line drift or contamination goes unrecorded, every downstream experiment that used those cells is called into question. Capturing passage number, viability, lots, and mycoplasma status on every passage is what protects that downstream work.**

2.2 The Documentation Problem

Recording passages on flask labels or an ad-hoc spreadsheet creates a set of interconnected risks:

- Passage number is tracked on a flask label or from memory, so the true age of a culture — and whether it has exceeded the lab's ceiling — is uncertain.
- Media and FBS lots are not recorded against the cells, so a serum-lot change that alters cell behavior cannot be traced when results shift.
- Viability readings are jotted down and discarded, so the trend that would reveal a declining culture is never assembled.
- Mycoplasma test dates and results live in a separate log, disconnected from the passages and the experiments that relied on the cells.
- There is no timestamped, attributed record of who passaged a shared line and when — a problem the moment more than one person maintains it.
- Prior passages of a line cannot be retrieved without hunting through notebooks, so the line's history cannot travel with it to another experiment or lab.

These are the gaps that let line drift and contamination invalidate downstream work, and they are the gaps this template was designed to close.

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3. Template Overview: What Ships with the Template

The ELabELN Cell Culture Experiment Template is a pre-populated experiment record available to all ELabELN subscribers directly from the template library. It ships configured for routine subculture of adherent HEK293 cells in a T75 flask, with a 10-step protocol covering the pre-passage confluency check through the next-day re-feed. The default configuration assumes DMEM + 10% FBS + 1% Pen/Strep media, 0.05% Trypsin-EDTA dissociation, a 1:6 split ratio, and a hemocytometer viability count using Trypan Blue. Every section is editable — the configuration is a tested baseline, not a locked format.

3.1 Template Sections at a Glance

The template populates the existing ELabELN experiment sections your lab already works in. Your team edits a working baseline instead of starting fresh notes for every passage.

Section	What it pre-populates
Main Text	Passage summary, line-history notes, and confluency observations, authored in the TinyMCE rich-text editor and linked to the seed-thaw entry for the line.
Extra Fields	Ten structured, typed fields grouped as Culture, Passage, and QC — cell line, passage number, confluency at passage, media composition, trypsin volume, hemocytometer count, viability percentage, and mycoplasma test date. Typed values make passage history queryable across experiments.
Steps	A 10-step workflow checklist covering the pre-passage confluency check through the next-day re-feed. Each tick is timestamped to the audit trail.
Compounds	DMEM, FBS, Pen/Strep, Trypsin-EDTA, PBS, and Trypan Blue pre-linked from the compound database with lot traceability carried in automatically.
Links & Resources	Pre-wired to the lab's Cell Culture SOP v3.2, the mycoplasma test schedule, and the seed-thaw record for this line.
Storage & Files	Cryovial storage in liquid-nitrogen vapor phase, working-stock locations, and labelled attachment slots for microscope images (JPG) and hemocytometer counts (CSV).

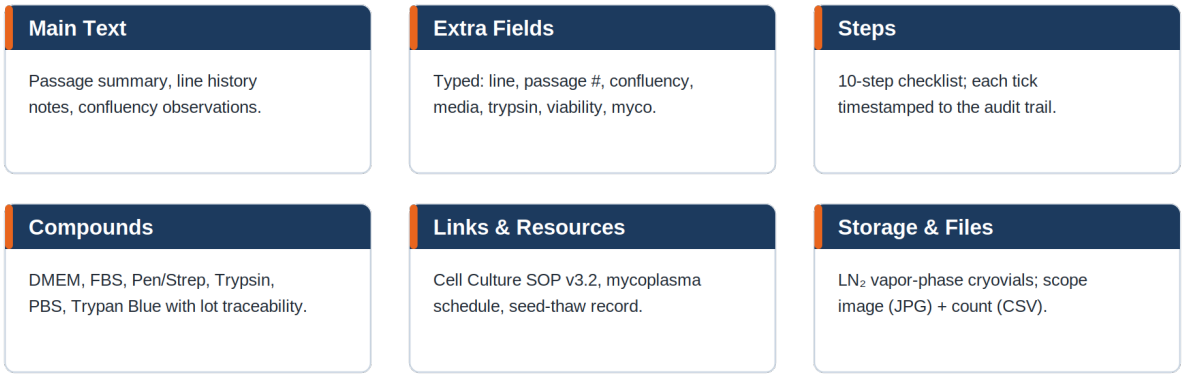
Main Text
Passage summary, line history notes, confluency observations.
Extra Fields
Typed: line, passage #, confluency, media, trypsin, viability, myco.
Steps
10-step checklist; each tick timestamped to the audit trail.
Compounds
DMEM, FBS, Pen/Strep, Trypsin, PBS, Trypan Blue with lot traceability.
Links & Resources
Cell Culture SOP v3.2, mycoplasma schedule, seed-thaw record.
Storage & Files
LN₂ vapor-phase cryovials; scope image (JPG) + count (CSV).

Figure 1. The six ELabELN experiment sections pre-populated by the cell culture template.

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3.2 The 10-Step Protocol

The workflow checklist is the operational spine of the template. Each step maps to a discrete bench action and writes a timestamped, user-attributed entry to the audit trail when checked off — with the confluency check and the viability count serving as the two assessment checkpoints that decide whether the passage proceeds and how healthy the culture is.

Step	Action	What it captures
1	Confluency check	Confluency at passage
2	Aspirate spent media	—
3	PBS wash	—
4	Trypsinize	Trypsin volume (0.05% Trypsin-EDTA)
5	Quench with media	Serum quench
6	Centrifuge	Spin conditions
7	Resuspend	—
8	Count & viability	Hemocytometer count; viability % (Trypan Blue)
9	Seed new flask	Seeding density; split ratio (1:6)
10	Return / next-day re-feed	Incubator return; e-signature

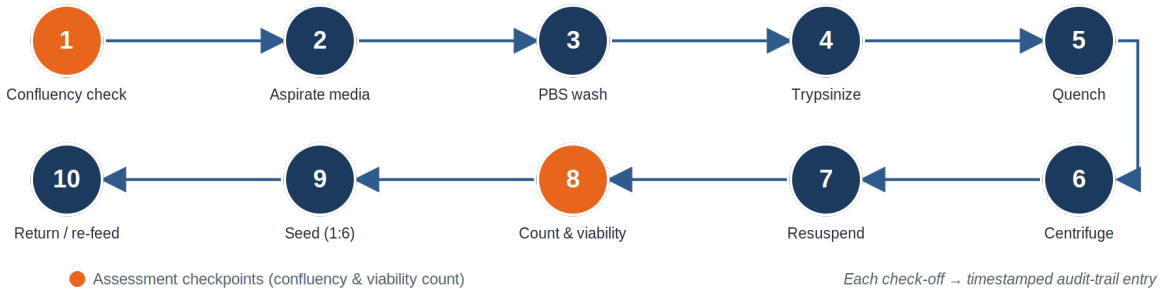

Figure 2. The 10-step subculture workflow — orange steps are the confluency and viability assessment checkpoints; every check-off writes a timestamped entry to the ELabELN audit trail.

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4. The Use Case: When and How the Template Is Used

The template is intended as a tested baseline for academic and life sciences labs maintaining cell lines for experimental work. It is configured around a recognizable reference — routine subculture of adherent HEK293 in a T75 flask — but the scenarios it serves cover the whole culture room.

4.1 Routine Line Maintenance (Primary Use Case)

The core scenario: keeping a line healthy through regular passaging. The template captures the passage number, confluency, viability, and lots on every subculture, so the line's ongoing health and age are documented continuously rather than reconstructed from a flask label.

4.2 Preparing Cells for Experiments

When cells are seeded for an assay, transfection, or screen, the experiment needs to know the line, its passage number, and its viability. Because those values live on the passage record and the line links across the ELabELN instance, a downstream experiment can reference cells of known age, health, and contamination status — not an anonymous flask.

4.3 Suspension Lines

For suspension cultures (CHO, Jurkat, K562), the same Culture, Passage, and QC structure applies. Move from adherent to suspension by editing the seeding section; the viability and passage tracking work identically.

4.4 Primary Cultures

Primary cells, with their limited lifespan and lot-to-lot variability, make passage-number and viability tracking even more important. The template's typed fields capture the finite passage history that primary work depends on.

4.5 Line QC: Viability, Mycoplasma, and Passage-Number Control

Because viability and passage number are typed values and the mycoplasma test date is captured per passage, the template doubles as a running quality-control record for the line. A PI can pull every passage for a line, see the viability trend, confirm when it was last tested for mycoplasma, and enforce a passage-number ceiling — the objective basis for retiring a culture and thawing a fresh working stock.

4.6 Multi-User, Teaching, Cross-Lab Sharing, and CRO Settings

Shared lines are maintained by many hands. Because every ELabELN edition includes unlimited users, the PI, postdocs, students, and visiting collaborators can all passage from the same template, and the pre-wired SOP enforces one consistent procedure. Because the full passage history is queryable and exportable, a line can be shared across labs with its provenance intact. Granular permissions let the PI decide who may edit culture records versus only review them — the basis a teaching lab or CRO needs for supervised, consistent documentation.

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5. Dependencies and Connected Workflows

The cell culture template does not exist in isolation. It sits inside a network of connected workflows — upstream, parallel, downstream, and recurring — that give the passage record its full scientific and provenance value.

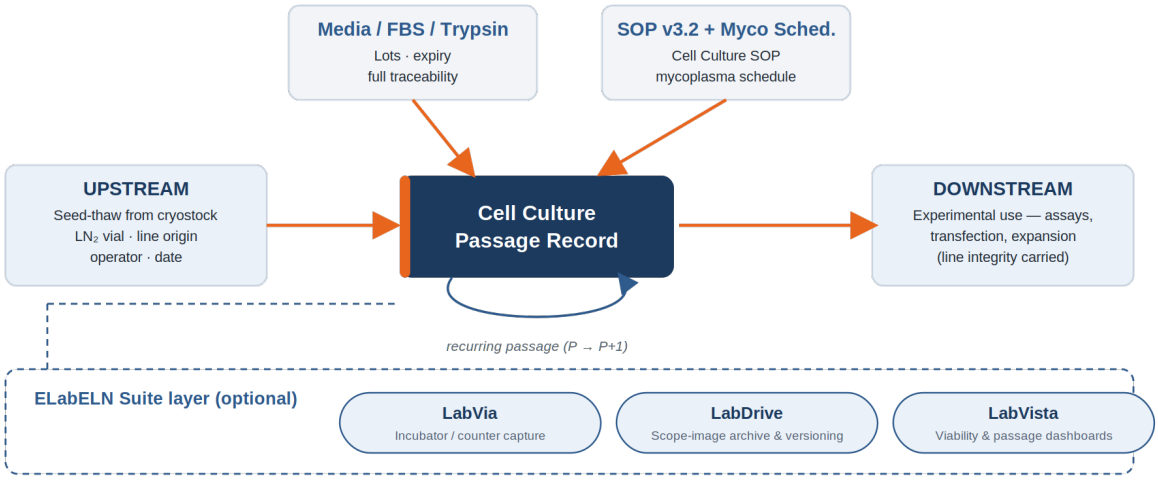

Figure 3. The template connects an upstream seed-thaw, parallel inventory and SOP/mycoplasma systems, downstream experimental use, and the recurring passage-to-passage cycle.

5.1 Upstream: Seed-Thaw from the Cryostock

A line's working culture begins with a thaw from a frozen stock. The template links to the seed-thaw record, so opening any passage surfaces the line's origin — which cryovial, which lot, thawed by whom and when — anchoring the entire passage history to a defined starting point in liquid-nitrogen storage.

5.2 Parallel: Media, Serum, and Reagent Inventory

The Compounds section links DMEM, FBS, Pen/Strep, Trypsin-EDTA, PBS, and Trypan Blue directly to the ELabELN inventory. Serum lot is a decisive variable in cell behavior, so this traceability matters. Through the link the record automatically carries:

- **Media and FBS lot numbers**, so a shift in cell behavior can be traced to a serum-lot change.
- **Expiry and stock levels**, with low-stock warnings before a passage, so a run is not started against expired or depleted reagents.
- **Full lot traceability for downstream work**, so the cells used in an experiment carry the reagent provenance of every passage that produced them.

Barcode and QR scanning can populate these links from the physical bottle, keeping lot capture effortless.

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5.3 Parallel: SOPs and the Mycoplasma Schedule

The Links section connects the passage to the lab's version-controlled Cell Culture SOP (v3.2 by default) and to the mycoplasma test schedule. Because the SOP is version-controlled, every passage records which procedure version it followed, and the mycoplasma schedule keeps contamination testing on cadence rather than ad hoc.

5.4 Downstream and Recurring: Experimental Use and the Passage Cycle

Cell culture is cyclical: each passage seeds the next, and the line continues indefinitely. The template captures that recurring cycle — passage after passage building one queryable history — while also feeding downstream experiments that draw on the cells. When a mycoplasma test is recorded as its own experiment, it links back to the passage record, and a “mycoplasma negative within 30 days” flag is shown on the passage so any downstream experiment referencing the line sees the contamination status at a glance.

5.5 The ELabELN Suite: Instruments and Dashboards

Everything above is available in ELabELN Standard. Labs on the ELabELN Suite gain three layers that connect to the same record: LabVia captures data from connected equipment such as automated cell counters and monitored CO_2 incubators; LabDrive adds metadata search, versioning, and role-based access across microscope-image archives and other lab files; and LabVista builds viability and passage-number dashboards on the structured culture metadata. The same audit trail and data-integrity controls span all layers.

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6. How the Scientist Benefits

The template is built to deliver value at the bench, not just to the quality system. The benefits compound with every passage a lab runs.

6.1 Start From a Tested Baseline, Not Fresh Notes

The scaffold — protocol, typed fields, media and reagent links, SOP and mycoplasma schedule — is already built. The scientist edits a working configuration to match the line and media they actually maintain, rather than starting fresh notes for every passage. The first passage is faster, and every subsequent one is consistent with it.

6.2 Document by Doing

Checking off each of the 10 steps as it happens produces a contemporaneous, timestamped record as a by-product of the passage. There is no separate write-up, and nothing to reconstruct from a flask label the following week.

6.3 Never Lose Lot Provenance Again

Because media, FBS, and trypsin are linked to inventory, the lot numbers are captured automatically and permanently on every passage. When an experiment's results shift, the serum-lot history of the cells is on the record — closing the most insidious cell-culture troubleshooting gap by default.

6.4 A Queryable Passage History per Line

Typed passage number, viability, and mycoplasma fields make the line's history queryable. A PI can pull every passage for a line, see the viability trend, confirm the last mycoplasma test, and know exactly when working stocks were created — turning a scattered set of flask labels into a single, trustworthy line record.

6.5 Protect Downstream Work and Share Lines with Confidence

The tamper-evident audit trail, version-controlled SOP linkage, and electronic signatures mean the record that results from normal use is already structured to support passage-history documentation, cross-lab line sharing with provenance intact, and FDA 21 CFR Part 11 review when the lab's quality system requires it — so line drift and contamination cannot silently undermine the experiments that depend on the cells.

> **AT THE BENCH, IN PRACTICE**
> A student opens the template, sets the line and media to match today's flask, scans the media and FBS bottles to capture their lots, and checks off each step as the passage proceeds. At the count step, the viability reading and hemocytometer count go straight into typed fields, the passage number increments, and the mycoplasma-status flag is right there on the record. Months later, the PI pulls the whole line and sees a clean viability trend and an on-cadence mycoplasma history — assembled with no effort beyond routine passaging.

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7. Passage History, Viability, and Contamination Tracking

7.1 The Default Reference: HEK293 in a T75 Flask

The template ships configured to passage adherent HEK293 in a T75 flask on DMEM + 10% FBS + 1% Pen/Strep, dissociated with 0.05% Trypsin-EDTA at a 1:6 split, with viability scored on a hemocytometer using Trypan Blue. This concrete reference demonstrates the full passage-and-QC workflow out of the box; swap the line, media, dissociation reagent, or split ratio to match what your lab maintains. The real power emerges over time, as each passage adds to a single queryable history for the line.

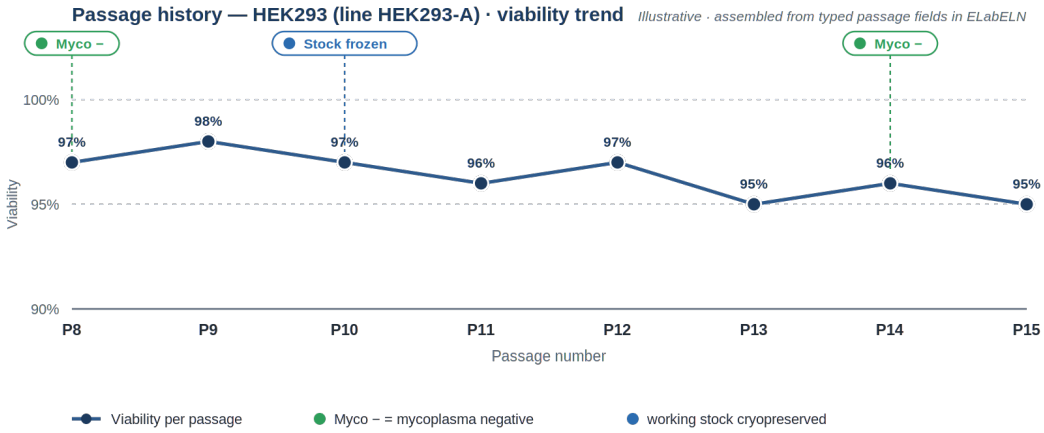

Figure 4. A line's passage history assembled from typed fields — viability per passage, mycoplasma-negative checkpoints, and the passage at which a working stock was cryopreserved. Illustrative data.

7.2 How the Template Handles Viability and QC

The hemocytometer count and viability percentage are captured as typed fields on every passage, and the microscope image and count file attach to the same record. The QC field group includes a typed mycoplasma test date, and when a mycoplasma test is recorded as its own experiment it links back to the passage — with a "negative within 30 days" flag surfaced on the record. Because all of these are typed and queryable, a lab can compare viability across passages, confirm contamination status at a glance, and enforce a passage-number ceiling for a line rather than treating each passage as an isolated event.

Element	Default configuration	Editable to
Cell line	HEK293 (adherent)	HeLa, CHO, Jurkat, K562, primary cultures
Media	DMEM + 10% FBS + 1% Pen/Strep	RPMI, F-12, serum-free formulations
Dissociation	0.05% Trypsin-EDTA	TrypLE, Accutase
Format / split	T75 flask, 1:6 split	Any vessel or split ratio
Viability readout	Hemocytometer + Trypan Blue	Automated counter

Figure 5. The template's default configuration — fully editable for any line, media, dissociation reagent, or format.

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8. Configuring the Template for Your Line

Adapting the template to a different line or media is a matter of editing the relevant sections — not rebuilding the structure.

8.1 Swap the Line, Media, Dissociation, and Split

Change the cell line (HEK293, HeLa, CHO, Jurkat, K562, primary cultures), the media composition (DMEM, RPMI, F-12, serum-free formulations), the dissociation reagent (Trypsin-EDTA, TrypLE, Accutase), and the split ratio. If the media and reagents already exist in the ELabELN compound database, simply re-link them; their lot numbers flow in automatically.

8.2 Move from Adherent to Suspension

For suspension lines, edit the seeding section to reflect suspension seeding density and remove the dissociation/wash steps that are specific to adherent cultures. The Culture, Passage, and QC fields work the same way.

8.3 Set Your QC Cadence

The mycoplasma test date field and the linked test schedule let you set and track the contamination-testing cadence your quality system requires, and the passage-number field supports whatever passage ceiling your lab enforces.

8.4 Save a Custom Version

Once configured, save your edits as a private template scoped to your lab, or publish back to the ELabELN template library. Every subsequent passage of that line opens from your configured version, and separate versions can be maintained for different lines, media, or regulatory contexts.

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9. Getting Started

ELabELN Standard is a cloud-hosted SaaS deployment typically live within one to two business days of account creation. There is no hardware to buy, no IT project, and no per-seat licensing.

1. **Start an ELabELN account.** Visit elabeln.com/get-started. ELabELN Standard runs on LabLynx's managed cloud infrastructure.
2. **Provision your instance.** LabLynx provisions the instance within one to two business days; you receive a URL, admin credentials, and onboarding documentation.
3. **Load the cell culture template.** From the template library, select the cell culture template and click “Use This Template.” An editable instance opens immediately.
4. **Add your media, sera, and reagents to the inventory.** Enter your media, FBS, Pen/Strep, dissociation reagents, and stains with lot numbers and expiry, and record cryovial storage locations. This is a one-time setup step.
5. **Link your SOP and mycoplasma schedule.** Upload your culture SOP and mycoplasma test schedule, and connect them to the template's Links section.
6. **Customize the template for your line.** Edit the cell line, media composition, dissociation reagent, and split ratio, then save as a private team version.
7. **Run your first passage.** Open your saved template, complete the 10-step checklist, attach the microscope image and viability count, and have the PI sign off electronically.

> **TYPICAL TIMELINE**
> Day 1: Account requested at elabeln.com/get-started. Day 2–3: Instance provisioned; media/serum/reagent inventory populated; SOP and mycoplasma schedule uploaded. Day 3–4: Template configured and saved as a private version for your line. Day 4–5: First passage documented in ELabELN with viability captured and an e-signature.

9.1 ELabELN Standard vs. ELabELN Suite

Capability	Standard	Suite
Cell culture template access	Included	Included
Unlimited users	Included	Included
Audit trail and e-signatures	Included	Included
Media / serum / reagent inventory with lot traceability	Included	Included
SOP & mycoplasma-schedule linking with version control	Included	Included
Microscope image + viability-count attachments	Included	Included
LabVia automated counter / incubator capture	—	Suite layer
LabDrive scope-image archive metadata search & versioning	—	Suite layer
LabVista viability & passage dashboards	—	Suite layer

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10. Frequently Asked Questions

Can I configure the template for my cell line and media?

Yes. Every section is editable. Swap in different adherent or suspension lines (HEK293, HeLa, CHO, Jurkat, K562, primary cultures), change the media composition (DMEM, RPMI, F-12, serum-free formulations), adjust the dissociation reagent (Trypsin-EDTA, TrypLE, Accutase), and change the split ratio. Save your edits as a private template scoped to your lab, or publish back to the ELabELN template library.

Does the template track passage number across experiments?

Yes. The passage number is a typed field carried in every cell culture experiment for a given line, and the line can be linked across the lab's ELabELN instance, so passage history is queryable per line. A PI can pull every passage for a specific line and see when it was last tested for mycoplasma, the average viability trend, and when working stocks were created from frozen aliquots.

How does the template handle mycoplasma testing and contamination tracking?

The QC field group includes a typed mycoplasma test date. When a test result is recorded as a separate experiment, that experiment links back to the passage record, and a “mycoplasma negative within 30 days” flag is shown on the passage so downstream experiments referencing the line see the contamination status at a glance.

Is it included in every ELabELN plan?

Yes. Every published template in the ELabELN library is available to all subscribers in both the Standard and Suite editions, with unlimited users in either edition and no per-template fee.

Can my whole lab use this template?

Yes. Every ELabELN edition includes unlimited users, so the PI, postdocs, grad students, rotating researchers, and visiting collaborators can all use the template without per-seat charges. Granular permissions let the PI control who can edit culture records versus only review them.

How quickly can my lab start culturing in ELabELN?

ELabELN Standard cloud deployment is typically live in one to two business days. Once the instance is provisioned, the template loads from the library in a single click, with the line, media, and passage parameters editable to match the cell stocks your lab actually maintains.

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11. Conclusion

The ELabELN Cell Culture Experiment Template is not simply a digital version of a passage log. It is a structured, audit-ready, searchable record that connects to your media and serum inventory, your SOPs and mycoplasma schedule, the seed-thaw that started your line, the experiments the cells feed, and — in the Suite edition — your automated counters, incubators, and viability dashboards. It turns the most repetitive workflow in the lab into a cumulative history that protects everything downstream of it.

For a laboratory that maintains lines continuously, the benefit compounds with every passage. Passage number, viability, lots, and mycoplasma status accumulate into one trustworthy per-line record. Every reagent lot is traceable. Every SOP version is documented. Every passage is timestamped, and every viability count is authenticated — so line drift and contamination can no longer quietly invalidate the work that depends on the cells.

The template is available to all ELabELN subscribers today. A new instance is live in one to two business days, and the first structured passage is typically complete within a week of account creation.

GET STARTED

Visit elabeln.com/get-started to request your ELabELN instance, or contact LabLynx at 866.522.5969 or info@lablynx.com. Load the cell culture template, configure it for your line and media, and run your next passage from a tested, audit-ready baseline.

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